

APPENDIX B

Acoustic Report

Prepared by Decibell Consulting Pty Ltd





Decibell Consulting *pty Ltd*

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL



Queensland
Government

Approval no: DEV2023/1418

Date: 31 August 2023

**Proposed Child Care Centre,
144 Grampian Dr,
Deebing Heights**

ENVIRONMENTAL NOISE IMPACT REPORT

Prepared for

Otiosum Pty Ltd

12th May 2022

Decibell Report No. 2110174 Ver 3.0

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1.0 INTRODUCTION

This report is submitted in response to a request by Citimax, on behalf of the Otiosum Pty Ltd for an environmental noise impact assessment of a proposed Child Care Centre to be constructed at 144 Grampian Drive, Deebing Heights

On-site noise logging and attended noise measurement were conducted, and through modelling, predictions of noise impacts from the development on the neighbouring residences have been undertaken. Based upon these predicted levels, recommendations regarding acoustic treatments and management practices have been specified.

1.1 The Proposal

The proposal is to construct a child care centre on a site at 144 Grampians Drive, Deebing Heights. This site is presently vacant and will be part of a larger development in the area.

The proposed centre will provide spaces for up to 120 children ranging in age up to 5 years. The children will be spread across six classrooms. In addition to these rooms the centre will provide two sleep rooms and a large play area to the rear of the site.

Parking for the centre will be located alongside the child care centre building. Thirty five car spaces will be provided for both staff and parents. Access to the car park will be via a driveway off a new internally road that will be part of the future development in the surrounding area. A loading delivery bay and bin store will also be located in the car park.

The child care centre will operate from 6.00 am to 6.00 pm week days.

While the area surrounding the site is presently vacant it will one day form part of a residential development. Noise impacts from the proposed child care centre could impact this future residential area and will be considered in this report.

For further details of the development layout refer to appendix for site and building plans.

2.0 EQUIPMENT

2.1 Existing Ambient Noise Assessment

The following equipment was used to record existing ambient noise levels at the site:

- Bruel & Kjaer Calibrator;
- Rion NL21 Environmental Noise Logger.

3.0 MEASUREMENT PROCEDURE

3.1 Ambient and Traffic Noise Measurements

The site is presently occupied by protestors, because of this access to the site is not possible without a police escort. Also, it is not possible to leave equipment on the site due to the risk of interference and vandalism of the equipment. In order to quantify noise levels at the site measurements previously recorded directly across the road from the site near the corner of Grampian Dr and Rawlings Rd will be used. These measurements were conducted as part of a previously acoustic report (Decibell Consulting Report No. 1805464) which was submitted to Ipswich City Council in relation to a development at 1 Cowie St. The location of the logger is indicated on the aerial photograph of the site included below.



Figure 1: Logger Measurement Location

The logger was set to record noise statistics in 15 minute blocks continually over the measurement period (Tuesday 15/05/18 and Thursday 17/05/18). Road traffic noise measurements were conducted generally in accordance with Australian Standard AS1055 2018 “*Acoustics – Description & Measurement of Environmental Noise*”.

The operation of the sound level measuring equipment was field calibrated before and after the measurement session and was found to be within 0.1 dB of the reference signal. All instrumentation used in this assessment hold current calibration certificate from a certified NATA calibration laboratory.

Weather conditions during the survey were fine, with temperatures ranging from 6° C to 25° C over the measurement period. Winds were light over this same period.

3.2 On Site Activity Noise Measurement

Source noise levels for various numbers of children in the play areas have been determined using the method contained in the *Association of Australian Acoustic Consultants Guideline for Child Care Centre Acoustic Assessment*. Typical noise levels associated with car park noise were taken from previous acoustic reports of a similar nature. All measurements were conducted generally in accordance with Australian Standard AS1055 2018 “*Acoustics – Description & Measurement of Environmental Noise*”.

4.0 NOISE CRITERIA

4.1 Noise Associated With On-site Activities

Point 3 of Part 12 Division 12 Community Use Code from the Ipswich Planning Scheme states that Community Use developments must minimise the impacts of noise on surrounding noise sensitive locations:

“(3) Specific Outcomes

- (a) Unreasonable levels of noise are not transmitted to noise-sensitive places, including existing and future residential areas.”

However the Code does not detail a particular methodology or criteria in regard to noise assessment. In the absence of a specific Council recommended methodology reference will be made to the *Environment Protection (Noise) Policy 2019* and more specifically the *Acoustic Quality Objectives* of the policy.

The *Acoustic Quality Objectives* are set out *Schedule 1* of the *Environment Protection (Noise) Policy 2019*. These Objectives relating to residential dwellings have been reproduced below. These objectives are to be achieved where possible and relate to the total level of ambient noise in the environment and are not to be used as point source criteria levels. In assessing noise impacts against these objective predictions will be made of the total noise in the residential area surrounding the proposed development over the extended periods defined by the parameter contained within *Schedule 1* of the *Environment Protection (Noise) Policy*. By demonstrating the acoustic Objectives of the Policy are achieved it can be demonstrated that the Policy's Objectives in relation to health, wellbeing and amenity are also achieved for future residents surrounding development.

Schedule 1 Acoustic quality objectives

section 8

Column 1	Column 2	Column 3			Column 4
Sensitive receptor	Time of day	Acoustic quality objectives (measured at the receptor) dB(A)			Environmental value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
dwelling (for outdoors)	daytime and evening	50	55	65	health and wellbeing
dwelling (for indoors)	daytime and evening	35	40	45	health and wellbeing
	night-time	30	35	40	health and wellbeing, in relation to the ability to sleep

4.2 Traffic Noise

The proposed site is not located in a *Transport Noise Corridor* as defined by Queensland Development Code MP 4.4- *Buildings in a Transport Corridor*. Grampians Drive is also not a state controlled road. The *Division 12 Community Use Code* from the *Ipswich Planning Scheme* does not contain specific requirements regarding to traffic noise. However, the *Environment Protection (Noise) Policy 2019* the policy contains a number of *Acoustic Quality Objectives* for the acoustic environment. Some of these relate to indoor noise levels for child care centres and kindergartens. These objects are contained within *Schedule 1* of the *Environment Protection (Noise) Policy* and have been reproduced below:

Environmental Protection (Noise) Policy 2019

Schedule 1

Schedule 1 Acoustic quality objectives

section 7

Column 1	Column 2	Column 3			Column 4
Sensitive receptor	Time of day	Acoustic quality objectives (measured at the receptor) dB(A)			Environmental value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
childcare centre or kindergarten (for indoors)	when open for business, other than when the children usually sleep	35			health and wellbeing
childcare centre or kindergarten (for indoors)	when the children usually sleep	30			health and wellbeing, in relation to the ability to sleep
school or playground (for outdoors)	when the children usually play outside	55			health and wellbeing, and community amenity

In absence of other criteria and guidance these *Acoustic Objectives* from the *Environment Protection (Noise) Policy 2019* will be used to assess traffic noise impacts on the proposed centre.

4.3 Mechanical Plant Noise (Air Conditioning Units)

In addition to the requirements of the Ipswich Planning Scheme the noise from some types of mechanical plant is dealt with specifically under the *Environmental Protection Act 1994*. These include air condition plant, pumps (such as pool pumps) and refrigeration equipment. The development will mostly likely have air conditioning units installed although there is no requirement for this.

Section 440 U *Air conditioning equipment* of the *Environmental Protection Act 1994* states conditioner plant must comply with the following noise limits:

- 1) *This Section applies to premises at or for which there is air-conditioning equipment.*
- 2) *An occupier of the premises must not use, or permit the use of, equipment on any day –*
 - (a) Before 7 a.m. if it makes a noise of more than 3 dB(A) above background level; or*
 - (b) From 7 a.m. to 10 p.m. if it makes a noise of more than 5 dB(A) above background level; or*
 - (c) After 10 p.m. if it makes a noise of more than 3 dB(A) above background level;*

In this report these criteria will be used to specify the noise limits for air conditioning units at the site.

5.0 RESULTS & CALCULATIONS

5.1 Acoustic Quality Assessment Criteria

The existing ambient noise parameters from Schedule 1 of *Environmental Protection (Noise) Policy* have been measured at the site. These parameters have been included in the table below.

		Sound Pressure Level SPL dB(A)		
		LA _{eq} 1hr	LA ₁₀ 1hr	LA ₁ 1hr
Acoustic Quality Parameters in the Vicinity of the Development (Weekdays)	Night (6.00 am – 7.00 am)	60	63	73
	Day (7.00 am – 6.00 pm)	60	63	73

Table 1: Existing Acoustic Quality Parameters in the Vicinity of the Development

5.1.2 Existing Background

In addition to the parameters relating to the Acoustic Quality Objective the measured background noise levels (L₉₀) were also recorded. These levels are recorded in table below:

Time Period	Background Noise Levels dB(A) L ₉₀
Night (6 am – 7 am)	47
Day (7 am – 6 pm)	48

Table 2: Existing Background Noise levels

5.2 Child Care Centre Noise Impacts

5.2.1 Child Care Centre Source Noise levels

Measured source noise levels and their duration of activities typical of a child care centre have been included in the table below. These levels have been taken from previous reports prepared by Decibell Consulting are presented in relation to the various noise parameters. Source noise levels for children playing have been determined using the source sound power levels and methods from the Association of Australian Acoustic Consultants- *Guideline for Child Care Centre Acoustic Assessment* are presented in the table below. These sources noise level have been corrected in accordance with AS 1055.

Noise Source	Corrected Source Level @ 1m L_{Aeq}	Corrected Source Level @ 1m L_{A10}	Corrected Source Level @ 1m L_{A1}	Duration of Event Min:Sec
Car door closure(slams)	73	76	80	0:02
Car by pass on driveway	63	75	79	1:00
Car Idling	67	69	71	0:30
Talking in car park	60	70	74	-
Car Start up	72	76	78	0:02
24 Children 1-2 Year Playing in Outdoor Area	75	78	82	-
30 Children 2-3 Year Playing in Outdoor Area	82	85	89	-
66 Children 3-5 Year Playing in Outdoor Area	87	90	94	-
Waste Collection	87	90	93	1:30

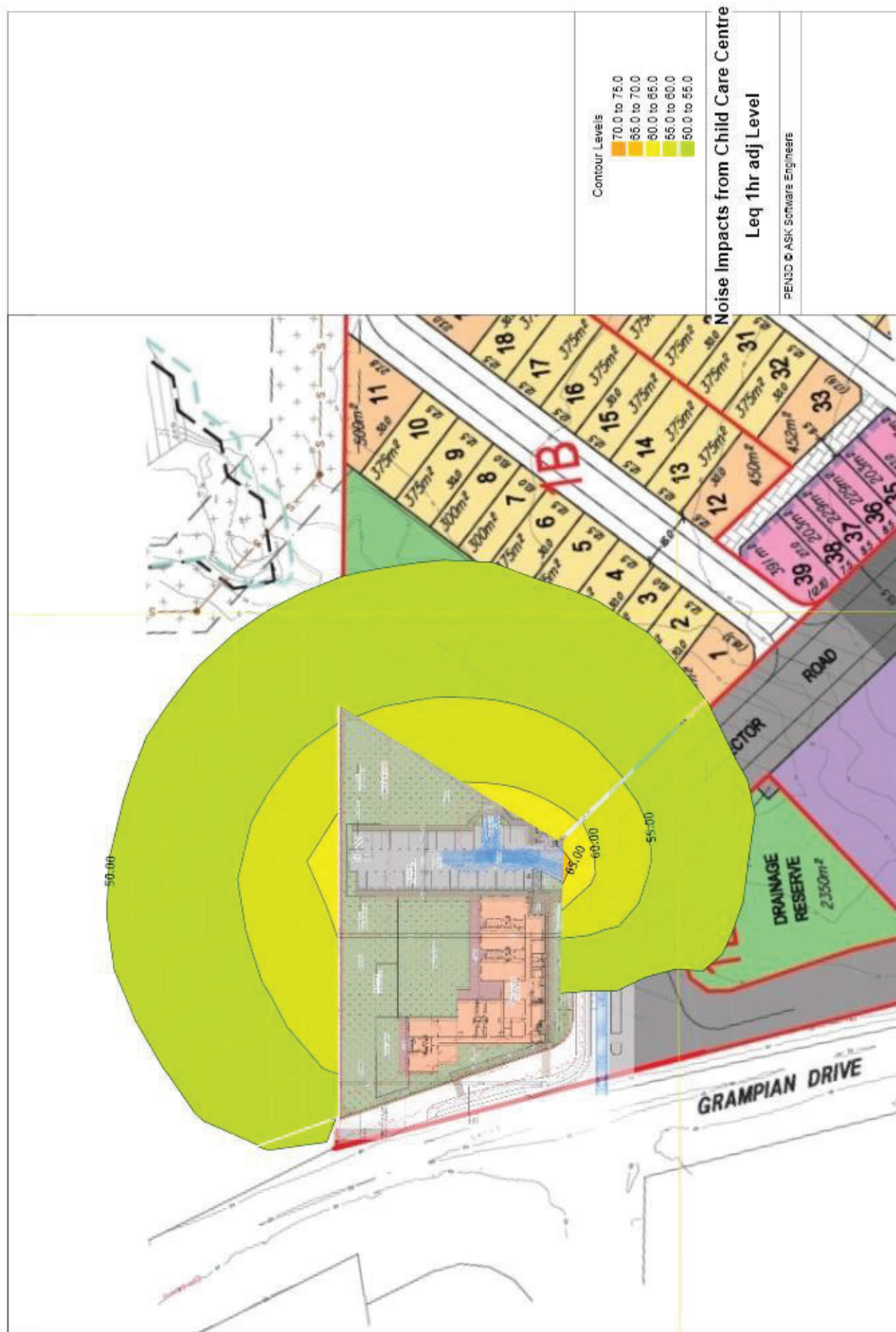
Table 3: Source Noise levels of Child Care Centre activities

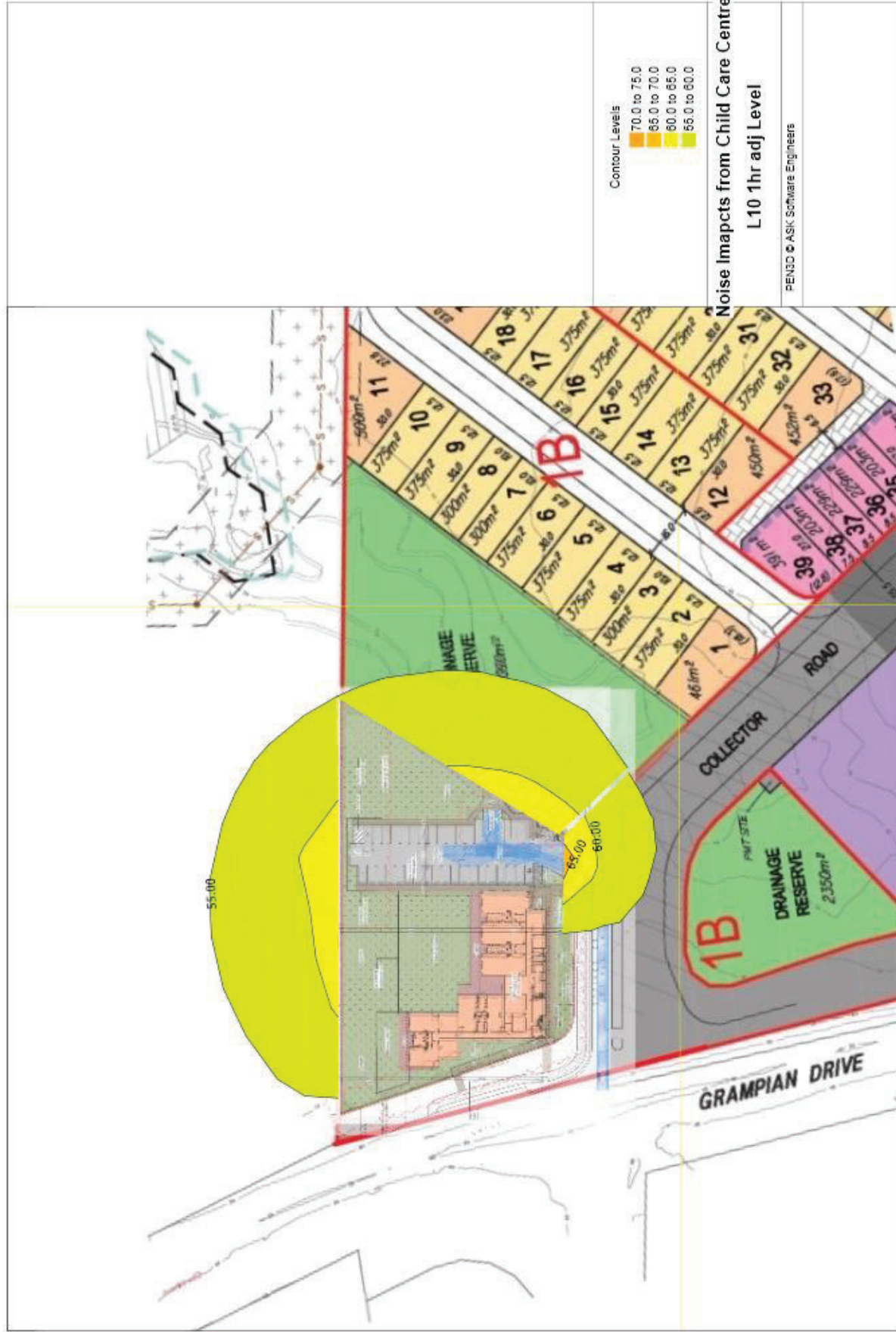
5.2.2 Predicted Total Noise levels

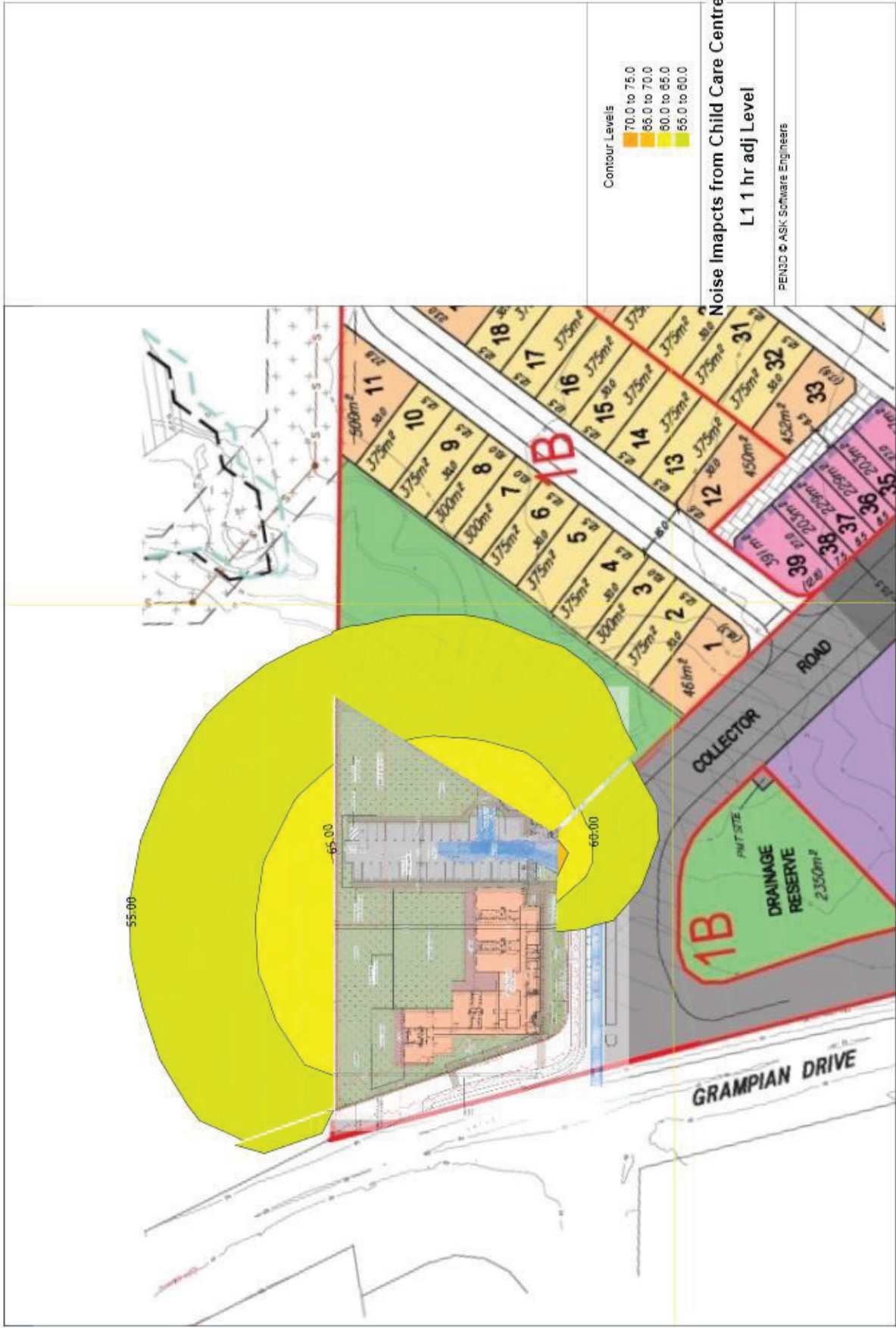
The source noise levels relating to child care centre have been used with the PEN3D200 noise modelling software to produce three noise contour maps relating to the $L_{eq,1hr,adj}$, $L_{10,1hr,adj}$ and $L_{1,1hr,adj}$ noise levels in the surrounding area. Modelling assumes:

- A peak vehicle generation of 48 vph is assumed at the child care centre based on the *RTA Guide to Traffic Generating developments*;
- Children are assumed to be playing evenly throughout the playground;
- Vehicles are distributed through the car park;
- Waste collection only occurs once a week from the site;

A noise contour map showing the total noise impacts on the surrounding area from the impacts of the child care centre are included over the next three page







5.3 Road Traffic Noise

5.3.1 Measured Levels Logger Survey

The table below presents measured road traffic noise levels measured at the logger measurement location which was on the corner of Rawlings Rd and Grampian Dr. At present there are no buildings on site and as such measurements can be regarded as free field and therefore do not include the + 2.5 dB façade reflection. The $L_{10,18hr}$ noise level was measured as approximately 61 dB(A). Graphical presentation of the logger measured noise levels are presented in the appendix to this report.

Descriptor	Time Period	Measured Level dB(A)
$L_{A10,18hr}$	6:00am to 12:00pm	61
Max $L_{Aeq,1hr}(7am - 6pm)$	4:00pm to 5:00pm	63

Table 4: Measured road traffic noise levels at proposed site.

5.3.2 Existing and Future Traffic Flows

Existing and future traffic flows are recorded below. Traffic data was obtained from TTM Traffic Engineers surveys conducted on Grampian Dr and Rawlings Rd and subsequent modelling of future volumes.

Predicted Year 2018 Traffic Flow:

Grampian Dr (formerly South Deebing Creek Rd): 8880 vehicles per 18 hour, 3 % HV

Predicted Year 2031 Traffic Flow:

Grampian Dr (formerly South Deebing Creek Rd): 12180 vehicles per 18 hour, 3 % HV

5.3.3 Modelled Noise Levels – Existing Situation

Road traffic noise predictions were conducted using PEN 3D 2000, a CoRTN based model produced by Ask Software Engineers, and a CoRTN based models are deemed acceptable by the Queensland Department of Main Roads. To verify the road traffic noise prediction model, the $L_{A10,18hr}$ traffic noise levels were calculated and compared to the measured noise levels. The following assumptions were made in the verification of the noise model:

- The road surfaces were assumed to be dense graded asphalt;
- The source line of traffic noise on both road is 0.5m above the road surface;
- The traffic speeds along the Grampian Dr are 80 km/hr as signed.
- The + 2.5 dB façade correction included in the PEN3D 2000 model has been removed to allow comparison with free field measurements.

A print out of the calculations performed by the model is included in the appendix to this report. The results are compared to the measured value in the table below.

Predicted $L_{A10,18hr}$	Measured $L_{A10,18hr}$
61.8	61.0

Table 5: A Comparison of Predicted and Measured Traffic Noise Levels at the Logger Location

The modeled levels are within the allowable tolerance of +/-2 dB of the measured levels, required by the CoRTN model.

5.3.4 Modelled Noise Levels – Year 2031

If the validity of the model is now accepted, the predicted increased traffic flows for the year 2031 can be input into the PEN 3D 2000 model to predict the ultimate traffic noise impacts. The predicted ultimate traffic noise level $L_{A10,18hr}$, in the year 2031 at the measurement location is 63.2 dB(A).

The ultimate traffic noise impacts at the rooms of the proposed child care centre have also been modelled using PEN 3D 2000. The results are recorded in the table below.

Location	Predicted Ultimate Traffic Noise Impact 2031 $L_{A10,18hr}$ dB(A)*	Predicted Ultimate Traffic Noise Impact 2031 $L_{Aeq,1hr max}$ dB(A)*
Nursery 1	62.3	64
Nursery 2	55.5	58
2-3 year Room 1	47.2	49
2-3 year Room 2	49.9	52
3-5 year Room 1	48.6	51
3-5 Year Room 2	49.0	51
3-5 year Room 3	50.4	52
Sleep Room 1	62.1	64
Sleep Room 2	47.3	49
Staff Room	58.4	60
Planning Room	49.7	52

Table 6: Predicted Ultimate Traffic Noise Levels at Various locations
Predicted Levels are Façade Level s and include the + 2.5 dB façade correction

In addition to noise impacts at the proposed building traffic noise impacts in the external play areas were also modelled at the site. The results of this modelling are included in the table below.

Location	Predicted Ultimate Traffic Noise Impact 2031 $L_{A10,18hr}$ dB(A)*	Predicted Ultimate Traffic Noise Impact 2031 $L_{Aeq,1hr max}$ dB(A)*
Play Area 1	59.7	62
Play Area 2	52.4	54

Table 7: Predicted Ultimate Traffic Noise Levels in play areas

Predicted Levels are free field and do not include the + 2.5 dB façade correction

6.0 RECOMMENDED ACOUSTIC TREATMENTS

6.1 Traffic Noise

Traffic noise levels have been modelled both at the facades of the building and in the play areas. The modelling of traffic noise levels in the play areas determined that traffic noise levels in these areas would exceed the *Acoustic Quality Objectives* for play areas from the *Environment Protection (Noise) Policy 2019*. In order to mitigate traffic noise levels in these areas it is recommended to construct a 2.4 m high acoustic barrier along the end of the play area and that this barrier would be returned along the northern boundary of the play area for a distance of 13 m and along the southern end of the barrier to meet the building. The barrier would be gap free and have a surface density of at least 12 kg/m². The location of this barrier is shown below.

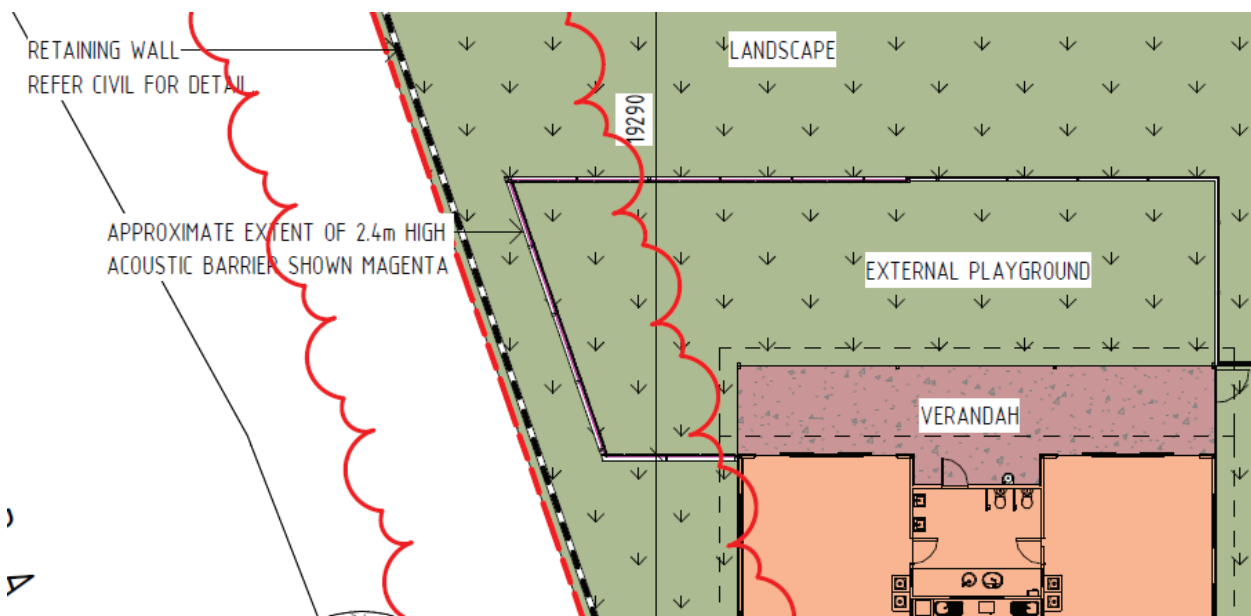


Figure 2: Location of proposed 2.4 m High Acoustic Barrier

The traffic noise levels have been remodelled allowing for the mitigation provided by the acoustic barrier. The results of this modelling are shown in the table below.

Location	Predicted Ultimate Traffic Noise Impact 2031 $L_{A10,18hr}$ dB(A)*	Predicted Ultimate Traffic Noise Impact 2031 $L_{Aeq,1hr}$ max dB(A)*
Play Area 1	53.1	55
Play Area 2	52.4	54

Table 8: Predicted Ultimate Traffic Noise Levels in play areas with barrier
Predicted Levels are free field and do not include the + 2.5 dB façade correction

The modelling now shows that traffic noise levels will not exceed the *Acoustic Quality Objectives* for play areas from the *Environment Protection (Noise) Policy 2019*.

The traffic noise impacts on the facades have been re-modelled allowing for the mitigation provide by the acoustic barrier. The results of this modelling have been included in the table below.

Location	Predicted Ultimate Traffic Noise Impact 2031 $L_{A10,18hr}$ dB(A)*	Predicted Ultimate Traffic Noise Impact 2031 $L_{Aeq,1hr max}$ dB(A)*
Nursery 1	62.3	64
Nursery 2	51.7	54
2-3 year Room 1	47.2	49
2-3 year Room 2	49.9	52
3-5 year Room 1	48.6	51
3-5 Year Room 2	49.0	51
3-5 year Room 3	50.4	52
Sleep Room 1	62.1	64
Sleep Room 2	47.3	49
Staff Room	58.4	60
Planning Room	49.7	52

Table 9: Predicted Ultimate Traffic Noise Levels at Various locations with Barrier in place

Predicted Levels are Façade Level s and include the + 2.5 dB façade correction

Calculations have been performed in order to determine the level of acoustic treatments that would need to be applied to various external elements of the development in order to achieve the *Acoustic Quality Objectives* for child cares from the from the *Environmental Protection (Noise) Policy 2019*.

Calculation of R_w values was performed in accordance with the method describing in Australian Standard AS 3671 – *(Road) Traffic Noise Intrusion- Building Sitting and Construction*. The following recommended acoustic treatments apply only to the building elements mentioned, and elements not included should be assumed to be constructed from standard building materials. Further details of the calculations are contained in the appendix of this report.

Room	Building Elements	Recommended Minimum Acoustic Treatment Rw
Nursery Room 1	Windows	Rw 34
	Sliding Door	Rw 28
	Walls	Rw 43
	Roof/Ceiling	Rw 45
Nursery Room 2	Windows	Rw 25
	Sliding Door	Rw 28
Sleep Room 1	Walls	Rw 46
	Roof/Ceiling	Rw 47
Staff Room	Windows	Rw 32
	Walls	Rw 40
	Roof/Ceiling	Rw 40

Table 10: Recommended Rw Ratings Of Building Elements

In addition to the above acoustic treatments, it is recommended that air conditioning or other ventilation be installed in the above rooms to allow the extended closure of windows and doors.

6.2 Acoustic Quality Objective Assessment

Modelling of the noise impacts from the proposed child care on the surrounding was conducted in Section 5.2 of this report. This modelling was presented as three noise contour mapping relating to the *Acoustic Quality Objectives of Environmental Protection (Noise) Policy 2019 for Dwellings*. Examining this modelling and noise contours that it can be seen that the only locations that noise impacts will exceed of the *Acoustic Quality Objectives of Environmental Protection (Noise) Policy 2019* is the area directly north of the site and the area east of the site. The area north of the site however is an area of park land and not a residential area. East of the site is located a drainage reserve (which cannot be built on) and then the residential area. Modelling of the L_{A1} 1 hr and L_{A10} 1 hr shows that noise impacts relating to these parameters will not exceed the *Acoustic Quality Objectives of Environmental Protection (Noise) Policy 2019* at the residential area east of the site. However, modelling did show that noise impacts relating to the L_{Aeq} 1hr parameter would exceed the *Acoustic Quality Objectives of Environmental Protection (Noise) Policy 2019*. In order mitigate noise impacts from the child care centre it is proposed to construct a 1.8 m high acoustic fence along the eastern side of the car park. The location of this acoustic fence is shown below.

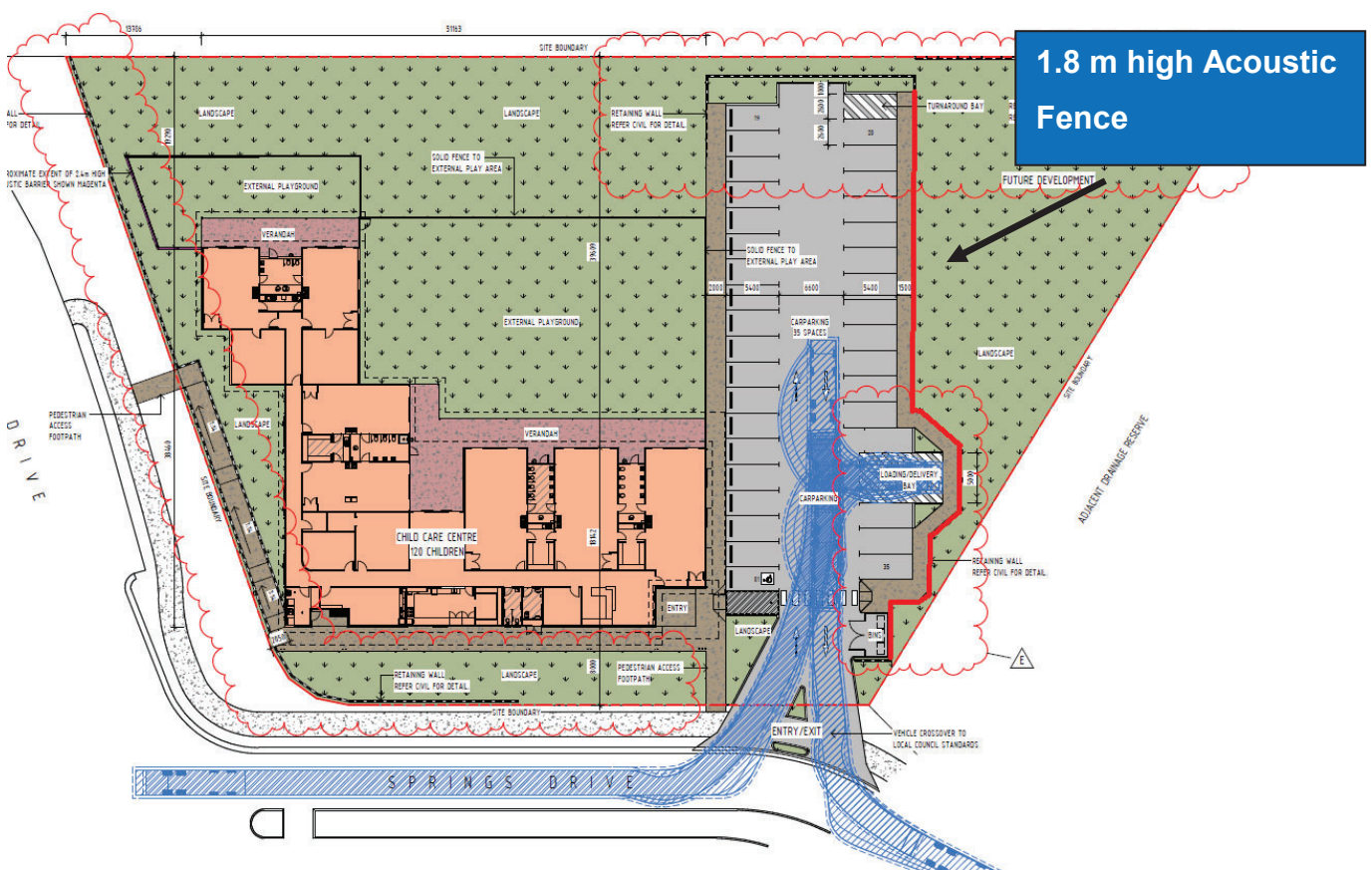


Figure 3: Location of proposed 1.8 m High Acoustic Fence

Further modelling of noise impacts from the child care allowing for the mitigation provided by the proposed acoustic fence has been conducted and included over the page. This modelling shows that the proposed acoustic fence will mitigate noise impacts relating to the L_{Aeq} 1hr parameter to below the *Acoustic Quality Objectives of Environmental Protection (Noise) Policy 2019*.



6.3 Mechanical Plant Noise (Air Conditioning Units)

Based on the noise limits from Section 440 U Air conditioning equipment of the *Environmental Protection Act 1994* it is recommended the air conditioner plant installed on site comply with the following noise limits:

Time Period	Noise Limits for AC Plant SPL dB(A) L_{90}
Night (6 am – 7 am)	50 $\{(L_{90}) + 3 \text{ dB}\}$
Day (7 am – 6 pm)	56 $\{(L_{90}) + 5 \text{ dB}\}$

Table 12: Noise limits for Air Conditioning Plant

It is recommended that the development is conditioned such that any air conditioning plant that may be installed as part of the development be conditioned to meet these noise limits.

7.0 DISCUSSION & CONCLUSIONS

Noise Impacts from proposed Child Care centre were then modelled on the surrounding residential area. This modelling was firstly presented as three noise contour mapping relating to the *Acoustic Quality Objectives* of *Environmental Protection (Noise) Policy 2019* for *Dwellings*. Examining this modelling and noise contours that it can be seen that the only locations that noise impacts will exceed of the *Acoustic Quality Objectives* of *Environmental Protection (Noise) Policy 2019* is the area directly north of the site and the area east of the site. The area north of the site however is an area of park land and not a residential area. East of the site is located a drainage reserve (which cannot be built on) and then the residential area. Modelling of the L_{A1} 1 hr and L_{A10} 1 hr shows that noise impacts relating to these parameters will not exceed the *Acoustic Quality Objectives* of *Environmental Protection (Noise) Policy 2019* at the residential area east of the site. However, modelling did show that noise impacts relating to the L_{Aeq} 1hr parameter would exceed the *Acoustic Quality Objectives* of *Environmental Protection (Noise) Policy 2019*. In order mitigate noise impacts from the child care centre it is proposed to construct a 1.8 m high acoustic fence along the eastern side of the car park. The location of this acoustic fence is shown in Section 6.2 of this report.

The impact of traffic noise from Grampians Drive on the proposed child care centre has also been considered in this report. Traffic noise levels have been modelled both at the facades of the building and in the play areas. The modelling of traffic noise levels in the play areas determined that traffic noise levels in these areas would exceed the *Acoustic Quality Objectives* for play areas from the *Environment Protection (Noise) Policy 2019*. In order to mitigate traffic noise levels in these areas it is recommended to construct a 2.4 high acoustic barrier along the top of the proposed retaining wall and that this barrier would be returned along the northern boundary of the site for a distance of 7 m. The barrier would be gap free and have a surface density of at least 12 kg/m². The location of this barrier is shown in section 6.1 of this report.

In addition to the proposed barrier calculations have been performed in order to determine the level of acoustic treatments that would need to be applied to various external elements of the development in order to achieve the *Acoustic Quality Objectives* for child cares from the from the *Environmental Protection (Noise) Policy 2019*. A table of the required acoustic treatments to the child care centre has also been included in Section 6.1 of this report.

Possible noise impacts from mechanical plant that may be installed on the site were also considered. In addition to the requirements of the Ipswich Planning Scheme the noise from some plant are dealt with specifically under the *Environmental Protection Act 1994*. It has been recommended that development be conditioned such that any future air conditioning plant that may be installed on site comply with the noise limits from the *Environmental Protection Act 1994*.

Subject to our calculations, the inclusion of the recommended 2.4 m and 1.8 m acoustic fences, and proposed acoustic treatments to the child care centre building, Decibell Consulting believe that development will comply with the requirements of the *Environmental Protection (Noise) Policy 2019* and *Point 3 of Part 12 Division 12 Community Use Code* from the *Ipswich Planning Scheme* and should be approved.

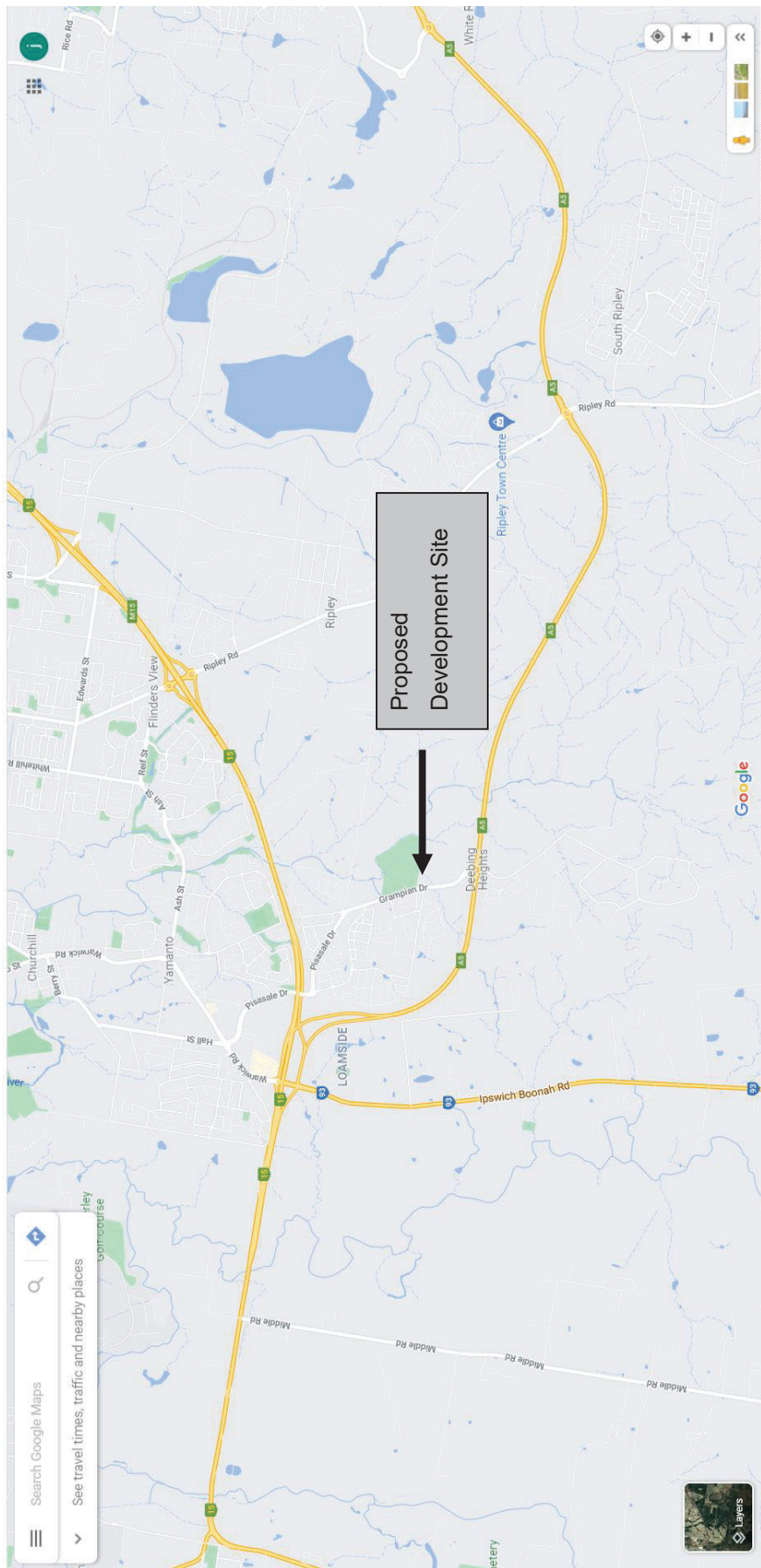
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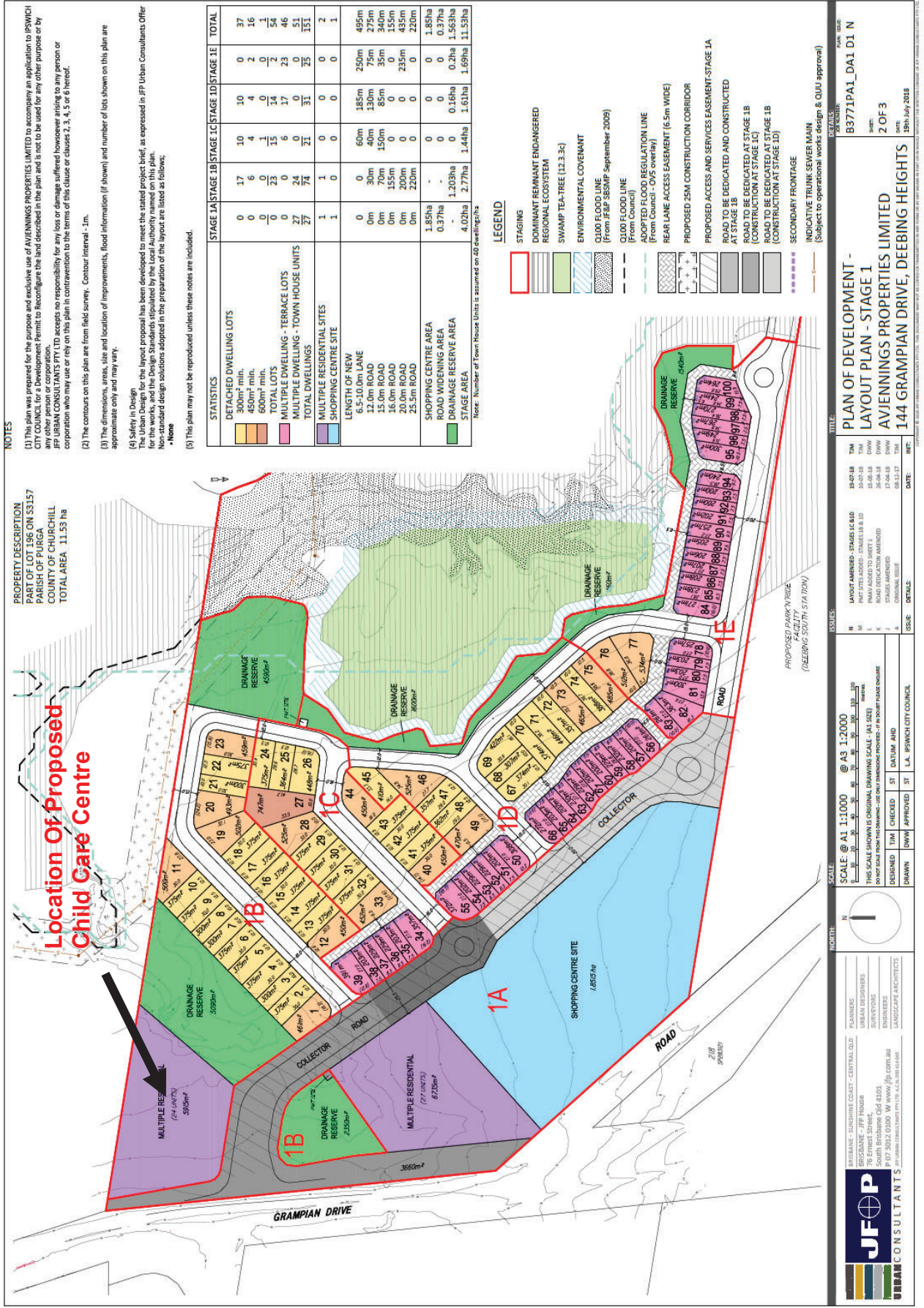
John Cristaudo BE
Decibell Consulting

APPENDIX

Sketch No.1 -Location of Proposed Development Site



Sketch No.2 –Proposed Development Site



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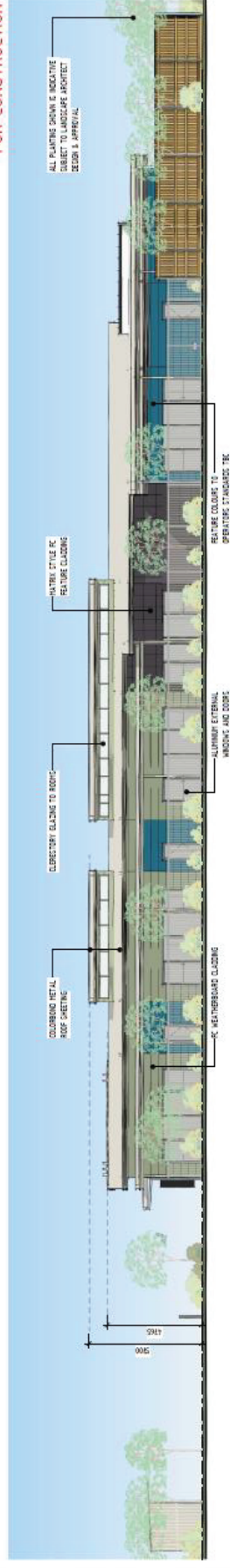
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1:100



NOTE: ACOUSTIC FENCE SHOWN
ADJUSTING FOR CLARITY OF SOUNDING



GRAMPIAN DRIVE



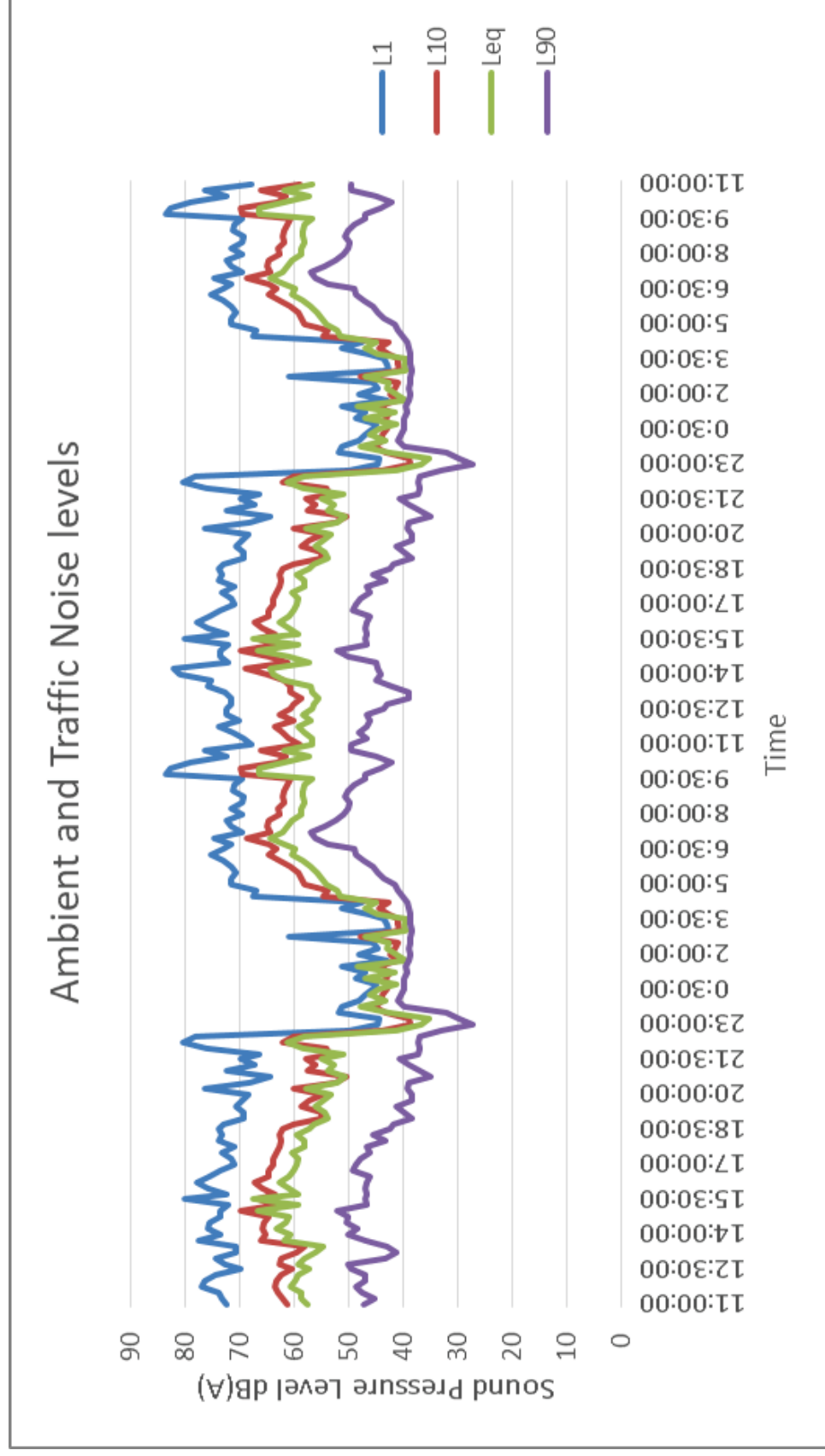
8 DA ELEVATION WEST
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[illegible]

NOISE MEASUREMENTS



TRAFFIC NOISE

Rw Calculations to AS3671

Space	Building Component	Impact dB(A)	Criteria dB(A)	TNR dB(A)	Element Area (m2)	Floor Area (m2)	Height (m)	RT60 (s)	C	TNA	Rw
Nursery Room 1											
	Window	64	35	29.0	4	45	2.4	1.0	4	28	34
	Sliding Doors*	54	35	29.0	9	45	2.4	1.0	4	32	28
	Wall	64	35	29.0	25	45	2.4	1.0	4	36	42
	Roof/Ceiling	64	35	29.0	45	45	2.4	1.0	4	39	45
Nursery Room 2											
	Window	54	35	19.0	4	42	2.4	1.0	4	19	25
	Sliding Doors	54	35	19.0	9	42	2.4	1.0	4	22	28
	Wall	54	35	19.0	16	42	2.4	1.0	4	25	31
	Roof/Ceiling	54	35	19.0	42	42	2.4	1.0	4	29	35
2-3 year Room 1											
	Sliding Doors	49	35	14.0	9	51	2.4	1.0	3	15	21
	Wall	49	35	14.0	2	51	2.4	1.0	3	9	15
	Roof/Ceiling	49	35	14.0	51	51	2.4	1.0	3	23	29
2-3 year Room 2											
	Sliding Doors	52	35	17.0	9	51	2.4	1.0	3	18	24
	Wall	52	35	17.0	2	51	2.4	1.0	3	12	18
	Roof/Ceiling	52	35	17.0	51	51	2.4	1.0	3	26	32
3-5 year Room 1											
	Sliding Doors	51	35	16.0	9	73	2.4	1.0	3	16	22
	Wall	51	35	16.0	6	73	2.4	1.0	3	14	20
	Roof/Ceiling	51	35	16.0	73	73	2.4	1.0	3	25	31
3-5 year Room 2											
	Sliding Doors	51	35	16.0	9	73	2.4	1.0	3	16	22
	Wall	51	35	16.0	6	73	2.4	1.0	3	14	20
	Roof/Ceiling	51	35	16.0	73	73	2.4	1.0	3	25	31
3-5 year Room 3											
	Sliding Doors	52	35	17.0	6	75	2.4	1.0	3	15	21
	Wall	52	35	17.0	12	75	2.4	1.0	3	18	24
	Roof/Ceiling	52	35	17.0	75	75	2.4	1.0	3	26	32
Sleep Room 1											
	Wall	64	30	34.0	23	30	2.4	1.0	2	40	46
	Roof/Ceiling	64	30	34.0	30	30	2.4	1.0	2	41	47
Sleep Room 2											
	Wall	49	30	19.0	23	30	2.4	1.0	2	25	31
	Roof/Ceiling	49	30	19.0	30	30	2.4	1.0	2	26	32
Staff Room											
	windows	60	35	25.0	4	22	2.4	1.0	3	26	32
	Wall	60	35	25.0	23	22	2.4	1.0	3	34	40
	Roof/Ceiling	60	35	25.0	22	22	2.4	1.0	3	34	40
Planning Room											
	Wall	51	35	16.0	8	16	2.4	1.0	2	20	26
	Roof/Ceiling	51	35	16.0	16	16	2.4	1.0	2	23	29

* Shielded by barrier

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description: PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampians Dr Deebling Heights\144 Grampains Dr Traffic.PEN

File Description: logger 2018

Sunday 03 Oct, 2021 at 10:21:29

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor

logger

X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
66.7	68.4	1.5	61.8

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description: PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampians Dr Deebling Heights\144 Grampians Dr Traffic.PEN

File Description:logger 2031

Sunday 03 Oct, 2021 at 10:22:32

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor

logger

X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
66.7	68.4	1.5	63.2

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description:PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampains Dr Deebling Heights\144 Grampains Dr Traffic.PEN

File Description: Rooms

Tuesday 03 May, 2022 at 13:30:07

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
Nursery 1	112.4	76.8	47.5	62.3
Nursery 2	125.7	82.4	47.5	55.5
2-3 year Room 1	135.4	63.9	47.5	47.2
2-3 year Room 2	123.2	56.1	47.5	49.9
3-5 year Room 1	142.5	61.2	47.5	48.6
3-5 Year Room 2	152.1	61.3	47.5	49.0
3-5 year Room 3	160.4	61.8	47.5	50.4
Sleep Room 1	115.2	68.2	47.5	62.1
Staff Room	129.1	41.6	47.5	58.4
Planning Room	122.9	49.0	47.5	49.7
Sleep Room 2	130.2	69.6	47.5	47.3

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampians Dr Deebing Heights\144 Grampains Dr Traffic.PEN

File Description: Rooms with barrier

Tuesday 03 May, 2022 at 13:55:37

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
Nursery 1	112.4	76.8	47.5	62.3
Nursery 2	125.7	82.4	47.5	51.7
2-3 year Room 1	135.4	63.9	47.5	47.2
2-3 year Room 2	123.2	56.1	47.5	49.9
3-5 year Room 1	142.5	61.2	47.5	48.6
3-5 Year Room 2	152.1	61.3	47.5	49.0
3-5 year Room 3	160.4	61.8	47.5	50.3
Sleep Room 1	115.2	68.2	47.5	62.1
Staff Room	129.1	41.6	47.5	58.4
Planning Room	122.9	49.0	47.5	49.7
Sleep Room 2	130.2	69.6	47.5	47.3

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description: PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampians Dr Deebing Heights\144 Grampains Dr Traffic.PEN

File Description:playareas

Tuesday 03 May, 2022 at 13:26:37

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor

	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
Play area One	115.8	85.6	47.5	59.7
Play area 2	143.7	74.0	47.5	52.4

POINT CALCULATIONS

Pen3D2000 V1.9.8

Project Code:Pen

Project Description: PEN noise model

File:C:\dB consulting\Noise Jobs\144 Grampians Dr Deebing Heights\144 Grampians Dr Traffic.PEN

File Description:playareas with barriers

Tuesday 03 May, 2022 at 13:28:12

CoRTN Calculations

All road segments included. Segmentation angle: 10degrees. Road elevations apply.

Receptor

	X Posn (m)	Y Posn (m)	Height (m)	L10(18hour) (dB(A))
Play area One	115.8	85.6	47.5	53.1
Play area 2	143.7	74.0	47.5	52.4